Evaluation of Architectural Education within the Scope of Construction Management: Turkey Application

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1 ABSTRACT

During the construction stage, not only engineers but also architects participate to the management of the project. Therefore, architects should also be informed sufficiently about construction management during their education.

However there are not enough lessons about construction management in the architecture faculties or departments of Turkish universities. Therefore the architects who are not sufficiently informed about construction management face some difficulties and problems. Undoubtedly, this situation has a negative effect on the quality and costs of the projects and causes various conflicts between the parties.

In this study, opinions of architects who are still in application are asked in order to determine the negative reflections of the above mentioned deficiencies in the architectural education. Survey method was used for data collection. 515 pieces of data with enough prevalence to represent all Turkey were collected and were analyzed by SPSS 18 package program.

At the end of the study, important findings were obtained such as the level of construction management information during architectural education in Turkey, the reflections of deficiencies related with this subject to application and the necessity to review the education programs in this context.

2 INTRODUCTION

During the construction stage, not only engineers but also architects participate to the management of the project . Therefore, architects should also be informed sufficiently about construction management during their education.

For example, in the directive of European Community Commission no 85/384/EEC the necessary basic requirements for ability to perform architecture are defined. As architecture is a discipline combining science, technology and art fields, these directives foresee a multi-directional knowledge and skill. Therefore there are many criteria within these directives. The articles of these directives related with construction managements are as follows:

- Having sufficient information about project financing, project management and cost control;
- Having sufficient information about production, organizing, legal regulations and processes necessary for converting the design ideas to structures and combining the plans with general planning decisions;
- Having necessary design skills for fulfilling the demands of people who are going to use the structures within limits of cost elements and construction plan

In direction of the above mentioned principles, lessons related with construction management can be found in the syllabus of the universities providing architectural education in developed countries. Besides, in many legal regulations in Turkey such as Physical Development Planning Law, Building Inspection Law and Public Tender Law, it is stated that architects will participate to the construction management process. However, sufficient lessons related with construction management cannot be found in the syllabus of the universities providing architectural education in Turkey. Therefore architects which are not sufficiently informed about construction management during their educations face various problems and failures during application. Undoubtedly, this situation effects the quality and costs of the constructions and cause various conflicts between parties.

In recent years, many new universities are being established in Turkey and therefore the number of architecture faculties increase rapidly. Especially during this process, raising awareness about necessity of construction management subjects taking place in architecture programs is very important.

In this study, the aim is to determine the architects' levels of gaining information about construction management during architectural education and the reflections of their deficiencies about this subject to application.

For the mentioned purpose, data was collected from architects who are still working in the application by survey method and the obtained findings were analyzed to develop suggestions.

3 RESEARCH METHOD

It is considered that the opinions of architects who are still working in the application, should be asked in order to reach solid data regarding the negative reflections of deficiencies related with construction management in architectural education in Turkey. For this purpose, survey method is adapted as data collection tool. The research is aimed to represent all Turkey so therefore the survey was aimed to reach to as much architect as possible. In this context, a professional organization was used in order to achieve this aim. The survey which was prepared online was sent to architects who are still in application by e-mail. Under the scope of the study, 515 surveys were collected. The security analysis, percentage and frequency distributions of the obtained data were performed by SPSS 18 package program.

In the reliability analysis, the reliabilities of variables which consists data that depends on perception related with construction management lessons that are being given or desired to be given, lack of education in construction management related subjects and related problems were measured. Cronbach's Alpha coefficient was used as scale.

4 FINDINGS

When the above mentioned methods are applied, the reliability of the survey was found to be 0,731. According to this value, the survey is considerably reliable.

When data is examined according to the cities that the participants work, it is observed that surveys were collected from 48 cities out of 81. In other words, data was collected from 59,2% of the cities in Turkey. Looking at the survey quantity distributions we can see that the number of surveys is directly proportional with the population of cities. Besides, looking at the university where the participants were graduated from, it was understood that 29 different architecture faculty graduates participated to the survey. There are 62 architecture faculties or departments in Turkey. It can be seen that quantity of surveys collected is representing almost half of the architecture faculties or departments. According to this data, it is assumed that survey results represent all Turkey.

The percentage frequency distributions of the participants according to age variable are given in Table 1.

Age	**Frequency**	**%**
20-30	163	*31,7*
31-40	158	*30,7*
41-50	90	*17,5*
51-60	72	*13,9*
60 and more	31	*6,0*
No response	1	*0,2*
Total	515	*100,0*

Table 1. Age distributions of architects participating to the survey

According to the values given in Table 1, it can be seen that the participation of young architects are more but that sufficient participation is obtained from all age groups.

When Table 2 showing the education levels of the participants is examined it can be seen that 58,8% of them are university graduates, 34% are post graduates and 4,7% have doctorate degrees.

Education Level	Frequency	%
University	303	*58,8*
Post graduate	175	*34,0*
Doctorate	24	*4,7*
No response	13	*2,5*
Total	515	*100,0*

Table 2. Education level distributions of architects participating to the survey

According to Table 2 data, it is understood that the evaluations made regarding architectural education programs under the scope of this study, does not cover only graduates but also post graduate level.

It is understood that, 85,7% of the participant architects work in private sector while 12% work in public sector. The details are in Table 3.

Sector type	Frequency	%
Public	62	*12,0*
Private	441	*85,7*
No response	12	*2,3*
Total	515	*100,0*

Table 3. Sector distributions of architects participating to the survey

In Table 4, title distributions of architects participating to the survey is shown.

Position / Title	Frequency	%
Contractor company owner / partner	151	*29,3*
Construction company owner / partner	62	*12,0*
Project director	85	*16,5*
Worksite chief	37	*7,2*
Office architect	143	*27,8*
No response	37	*7,2*
Total	515	*100,0*

Table 4. Title distributions of architects participating to the survey

According to this data, 29,3% of the participant architects are contactor company owner / partner, 27,8% are office architects. Remaining 42,9% are architects who are directly related with construction management.

Evaluations about the construction management knowledge levels of the architects during their educations are given in Table 5.

Subjects related with construction management	Frequency and Percentages	Sufficiently Informed	Slightly Informed	Not mentioned at all	No response	Total
Bill of quantities and estimating	Frk	99	**271**	**140**	5	515
	%	*19,2*	***52,6***	***27,2***	*1,0*	*100,0*
Preparation of contracts and technical specifications	Frk	34	**179**	**296**	6	515
	%	*6,6*	***34,8***	***57,5***	*1,2*	*100,0*
Tender process	Frk	28	**170**	**306**	11	515
	%	*5,4*	***33,0***	***59,4***	*2,1*	*100,0*
Site organization and management	Frk	92	**254**	**162**	7	515
	%	*17,9*	***49,3***	***31,5***	*1,4*	*100,0*
Work schedules	Frk	88	**231**	**188**	8	515
	%	*17,1*	***44,9***	***36,5***	*1,6*	*100,0*
Progress payment	Frk	38	**167**	**303**	7	515
	%	*7,4*	***32,4***	***58,8***	*1,4*	*100,0*
Control of construction process	Frk	55	**228**	**219**	13	515
	%	*10,7*	***44,3***	***42,5***	*2,5*	*100,0*
Physical development planning law	Frk	114	**240**	**154**	7	515
	%	*29,9*	***46,6***	***22,1***	*1,4*	*100,0*
Health and Safety	Frk	42	**189**	**275**	9	515
	%	*8,2*	***36,7***	***53,4***	*1,7*	*100,0*
Quality management	Frk	36	**164**	**307**	8	515
	%	*7,0*	***31,8***	***59,6***	*1,6*	*100,0*
Concurrent engineering concept	Frk	35	**126**	**340**	14	515
	%	*6,8*	***24,5***	***66,0***	*2,7*	*100,0*
Feasibility planning	Frk	53	**150**	**304**	8	515
	%	*10,3*	***29,1***	***59,0***	*1,6*	*100,0*
Contractor organization	Frk	35	**141**	**328**	11	515
	%	*6,8*	***27,4***	***63,7***	*2,1*	*100,0*

Table 5. Construction management knowledge levels of architects participating to the survey during their university education

According to the values in Table 5, it is strongly believed that architects are either not informed or slightly informed about construction management during their university education.

The answers of architects to the questions regarding the problems due to lack of information about construction management during architectural education are given in Table 6.

According to the Table 6 values, we understand that architects have serious and prevalent problems regarding preparation for tender, site management, work schedule preparation and monitoring, contracts and technical specifications arrangement, control of the construction process and concurrent engineering concept.

The values in Table 5 and 6 show that the architects playing important role in construction and project management have lack of information regarding construction management and that lack of information has negative reflections on construction process.

Problems due to lack of information about construction management during architectural education	Frequency and percentages	Always	Frequently	Sometimes	Rarely	Never	No response	total
We faced serious problems both in preparation stage of tenders and during tenders	Frk	**67**	**148**	**177**	61	27	35	515
	%	***13,0***	***28,7***	***34,4***	*11,8*	*5,2*	*6,8*	*100,0*
We faced and are facing problems about site establishment, organization and management	Frk	**42**	**136**	**174**	91	38	34	515
	%	***8,2***	***26,4***	***33,8***	*17,7*	*7,4*	*6,6*	*100,0*
We faced and are facing problems both regarding work schedule preparation and monitoring	Frk	**39**	**143**	**145**	104	48	36	515
	%	***7,6***	***27,8***	***28,2***	*20,2*	*9,3*	*7,0*	*100,0*
We feel that our lack of information regarding concurrent engineering concept causes many negative results	Frk	**66**	**130**	**136**	95	41	47	515
	%	***12,8***	***25,2***	***26,4***	*18,4*	*8,0*	*9,1*	*100,0*
We faced and are facing problems related with both contracts and technical specifications preparations deficiencies	Frk	**58**	**155**	**163**	73	29	37	515
	%	***11,3***	***30,1***	***31,7***	*14,2*	*5,6*	*7,2*	*100,0*
We faced and are facing problems both due to lack of information about health and safety precautions and regulations	Frk	**55**	**135**	**141**	94	43	47	515
	%	***10,7***	***26,2***	***27,4***	*18,3*	*8,3*	*9,1*	*100,0*
We faced and are facing problems due to both lack of information about control of construction process and related regulation	Frk	**57**	**132**	**164**	74	47	41	515
	%	***11,1***	***25,6***	***31,8***	*14,4*	*9,1*	*8,0*	*100,0*

Table 6. Distribution of problems due to lack of information about construction management during architectural education

Under the scope of the study, the lessons related with construction management in architectural education programs were examined. The participant answers to the questions related with the subject are given in Table 7.

Lessons related with construction management in architectural education programs	**Frequency**	**%**
Health and safety	50	*9,7*
Bill of quantities and estimating	153	*29,7*
Site organization	136	*26,4*
Construction law	192	*37,3*
Work law	106	*20,6*
Computer supported scheduling	76	*14,8*
Construction management	175	*34,0*
Engineering economy	38	*7,4*
Note: As participants selected one or more than one answer the frequency and percentage value totals could not be given		

Table 7.Distributions of lessons in the education programs of the architects participating to the survey

When the above table is examined it can be seen that only 9,7% of the 515 participants stated that there are lessons related with health and safety in the architectural education programs. In other words 90,3% of the participants did not take lessons related with health and safety. When the issue is evaluated on university

basis by crosstabs it was understood that lessons related with health and safety are not given in 13 universities out of 29.

It was determined that, in the education programs that the participants were graduated, lessons related with bill of quantities and estimating was not given in 70,3%, lessons related with site organization was not given in 73,6%, lessons related with construction law was not given in 62,7%, lessons about work law was not given in 79,4%, lessons related with computer supported scheduling was not given in 85,2%, lessons about construction management was not given in 66% and lessons about engineering economy was not given in 92,6%. Therefore it is understood that most of the lessons related with construction management are not given in architectural education programs.

The answers of participants to the questions regarding the lessons which are not present but desired to be present related with construction management in architectural education programs are given in Table 8.

Desired lessons related with construction management in architectural education programs	**Frequency**	**%**
Health and safety	261	*50,7*
Bill of quantities and estimating	335	*65,0*
Site organization	338	*65,6*
Construction law	278	*54,0*
Work law	261	*50,7*
Computer supported scheduling	322	*62,5*
Construction management	309	*60,0*
Engineering economy	193	*37,5*
Quality management	284	*55,1*
Primevera package program	150	*29,1*
MS Project package program	186	*36,1*
Construction machines	133	*25,8*
Cost estimation and control	367	*71,3*
Not: As participants selected one or more than one answer the frequency and percentage value totals could not be given		

Table 8. Distributions of lessons which are desired to take place in the education programs of the architects participating to the survey

Data in Table 8, support the data in Table 7. When Table 8 is examined architects strongly desire the health and safety, bill of quantities and estimating, site organization, construction law, work law, computer supported scheduling, construction management, quality management, cost estimation and control subjects to be incorporated to the architectural education program. According to these values, we can see how prevalent and serious are the requirement of architects about the information on these subjects.

5 CONCLUSION AND SUGGESTIONS

Architects play role in every stage of the construction, from project design to the application. According to the legislation in Turkey, architects have responsibility about construction management as much as engineers. However the results of this study show that;

- In Turkey, sufficient information about construction management is not given in architectural education program.
- This lack of information causes architects to face serious problems in the application process.
- Due to mentioned reasons, architects desire lessons related with especially cost, health and safety and legislation to be given in the education programs.
- The most dramatically situation determined by the research is that the necessary importance is not given to the health safety subject in the education of the architects although construction sector has the most quantity of fatal work accidents.

The results of this research show that lessons about construction management should sufficiently take place in the current universities and new universities that are going to be established. Besides, the sharing of the findings obtained from this kind of researches with professional chambers will hopefully contribute to raising awareness about this subject.

6 REFERENCES

Andrew M. Civitello, Jr: Constructions manual of policies and procedures. United States of America, 2000.
Arthur F. O'Leary: A guide to successful construction. California, 1996.
C. Edwin Haltenhoff: The CM contracting system, fundamentals and practices. New Jersey, 1999.
David Bilbo, Tim Fetters, Richard Burt, James Avant**:** A study of the supply and demand for construction education graduates. In: Journal of Construction Education, Vol. 5, Issue 1, pp. 78-89. USA, 2000.
Hande Nalçakan: Küreselleşen dünyada mimarlık eğitimi ve türkiye. Yıldız Teknik Üniversitesi, Fen Bilimleri Enstitüsü, Yüksek Lisans Tezi, İstanbul,2006.
Jeffrey L. Beard, Michael C. Loulakis, Edward C. Wundram: Design-Build. Mexico, 2001.
Justin Sweet: The architectural profession responds to construction management and design-build: the spotlight on aia documents. In: Law and Contemporary Problems, Vol. 46, Issue 1, pp. 69-82, Durham, 1983.
Keith Collier: Construction contracts. New Jersey, 2001.
Osama Abudayyeh, Jeffrey Russell, David Johnston, James Rowings: Construction engineering and management undergraduate education. In: Journal of Constructıon Engıneerıng and Management, Vol. 126, Issue 3, pp. 169-175.
Ralph W. Liebing: Construction contract administration. New Jersey, 1998.
Robert D. Hindle, Pantaleo Rwelamila: Resistance to change: architectural education in a turbulent environment. In: Engineering, Construction and Architectural Management, Vol. 5, Issue 2, pp. 150-158. 1998.
Roy Pilcher: Principles of construction management. United Kingdom, 1992.
Stephen Emmitt: Architectural management in Practice. France, 1999.
Rüveyda Kömürcü: Mimarlık eğitimi lisans programlarında proje yönetimi ve kalite yönetiminin önemi. Mimarlık Eğitiminin Dünü, Bugünü, Yarını. In: Ulusal Sempozyum Bildirileri Kitabı, pp. 540-549. Konya, 2010.
85/384/EEC Sayılı Mimarlar Direktifi: http://www.mo.org.tr/UIKDocs/mimarlardirektifi.pdf
3194 Sayılı İmar Kanunu: Türkiye, 1985.
4708 Sayılı Yapı Denetim Hakkında Kanun: Türkiye,2011.
4734 Sayılı Kamu İhale Kanunu: Türkiye,2002.
Yapı Denetim Uygulama Yönetmeliği: Türkiye, 2008.
http://www.epoka.edu.al/
http://www.arct.cam.ac.uk/Arct/Home.aspx
http://architecture.brookes.ac.uk/
http://www.architecture.yale.edu/drupal/
http://arch.ced.berkeley.edu/